

**NOTES:**

1. DESIGN CRITERIA:
  - A. SOIL DATA: UNIT WEIGHT 2250 KG/M<sup>3</sup>  
KA (ACTIVE SOIL PRESSURE COEFFICIENT) 0.286  
MAXIMUM ALLOWABLE BEARING PRESSURE: 210 KPA
  - B. MATERIALS: STEEL REINFORCEMENT AASHTO M-31M GRADE 420 CONCRETE F'C = 35 MPA (PRECAST BOX)
  - C. DESIGN: \*SERVICE LOAD OR LOAD FACTOR DESIGN
 

LOAD FACTOR:	CAPACITY REDUCTION FACTORS
	SHEAR - $\phi$ = 0.85
	BENDING - $\phi$ = 0.90
Y AND B FACTORS: (GROUP I LOADING)	
	Y = 1.3
EARTH: $\beta_e$	= 1.3 VERTICAL
	= 1.0 LATERAL
DEAD: $\beta_o$	= 1.0
LIVE: $\beta_L$	= 1.67
IMPACT - REFER TO AASHTO SECTIONS 3.8 AND 6.4	
SERVICE LOAD AND FACTORS: (GROUP I LOADING)	
	Y = 1.0
EARTH: $\beta_e$	= 1.3 VERTICAL
	= 1.0 LATERAL
DEAD: $\beta_o$	= 1.0
LIVE: $\beta_L$	= 1.0
  - D. MISCELLANEOUS: DESIGN LIVE LOAD AASHTO MS-22.5.
2. HYDRAULIC DATA:
 

RETURN PERIOD (YEARS)	DISCHARGE (CMS)	HEADWATER ELEVATION
2.33	2.8	178.1
10	5.7	178.5
25	8.5	178.9
50	11.3	179.2
100	14.2	179.5

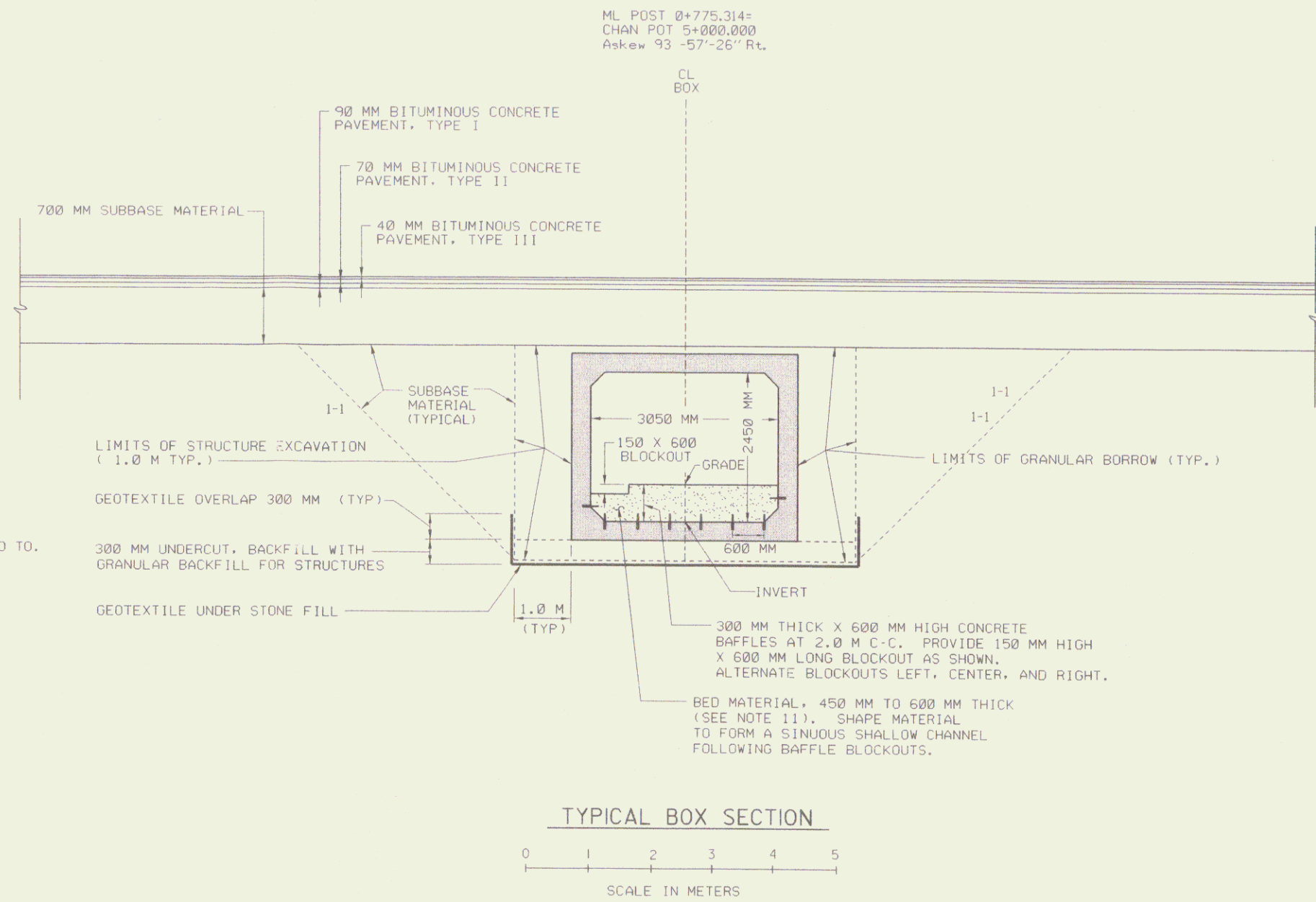
MINIMUM WATERWAY AREA: 5.4 SM  
DESIGN FLOW (Q<sub>d</sub>) = 11.3 CMS  
OUTLET VELOCITY AT Q<sub>d</sub> = 3.7 MPS; AT Q<sub>100</sub> = 4.0 MPS  
ROADWAY OVERTOPPING IS NOT EXPECTED TO OCCUR FOR FLOWS LESS THAN Q<sub>100</sub>

DRAINAGE AREA = 4.32 SQ. KM.  
TAILWATER AT Q<sub>d</sub> = EL 178.0  
AVERAGE DAILY FLOW = 0.1 CMS
3. THE PRECAST SECTION SHOWN IS APPROXIMATE. THE ACTUAL SHAPE WILL BE DEPENDENT UPON THE FABRICATOR. MINOR DIFFERENCES FROM THE SHAPE SHOWN ARE ACCEPTABLE. ALL OF THE UNITS SHALL HAVE THE SAME SHAPE. INDIVIDUAL UNIT LENGTHS DEPICTED ON DRAWINGS ARE X.X M. OTHER UNIT LENGTHS MAY BE USED BUT A MIN. LENGTH OF 1.2 M MUST BE ADHERED TO.
4. THE HEADWALLS, WINGWALLS, CUTOFF WALLS AND APRONS SHALL BE CAST IN PLACE. ALLOWABLE STRESS FOR CAST-IN-PLACE CONCRETE, CLASS B: F'C=10 MPA, F'C=25 MPA.
5. SEE SPECIAL PROVISIONS FOR ADDITIONAL SPECIFICATIONS ON THE PRECAST UNITS.
6. THE EXTERIOR (TOP & SIDES) AND INTERIOR (SIDES & BOTTOM) OF ALL CONCRETE BOX JOINTS ALONG WITH ALL LIFTING HOLES SHALL BE FILLED WITH MORTAR, TYPE IV AFTER BEING SET IN THEIR FINAL POSITION. ALL MORTAR SHALL BE WET CURED A MIN. OF 24 HRS. PRIOR TO THE WATERPROOFING DESCRIBED IN NOTE NO. 8.
7. DOWELS AND INSERTS SHALL BE PROVIDED BY THE FABRICATOR OF THE PRECAST UNITS WITH COSTS SUBSIDIARY TO ITEM 540.10 PRECAST CONCRETE BOX.
8. A 600 MM WIDE STRIP OF SHEET MEMBRANE WATERPROOFING SHALL BE APPLIED AT EACH SIDE JOINT. THE MEMBRANE SHALL BE CENTERED ON THE JOINT AND COVER THE FULL HEIGHT OF SIDE JOINTS. THE ENTIRE TOP SHALL THEN BE COVERED WITH MEMBRANE. THE SHEETS SHALL OVERLAP THE EDGES BY 300 MM ON EACH SIDE. AFTER MEMBRANE PLACEMENT THE REMAINDER OF THE EXPOSED SIDES SHALL BE COATED WITH TAR EMULSION APPLIED AS PER SECTION 404.06(A). PAYMENT FOR THE MEMBRANE AND EMULSION WORK SHALL BE BY THEIR RESPECTIVE ITEM.
9. COSTS FOR ALL MORTAR, TYPE IV USED SHALL BE PAID FOR AS ITEM 540.10. PRECAST CONCRETE BOX. CONCRETE BAFFLES SHALL BE PAID FOR AS CONCRETE, CLASS B. BAFFLES SHALL BE ATTACHED TO BOX WITH DOWELS. THE DOWELS SHALL BE CAST INTO THE PRECAST BOX SECTIONS. DRILLING DOWELS INTO THE BOX SECTION WILL NOT BE ALLOWED.
10. OMIT WEEP HOLES IN ALL PRECAST BOX SECTIONS.
11. BED MATERIAL TO BE PLACED WITHIN THE BOX AND ON THE APRONS SHALL BE MATERIAL EXCAVATED FROM THE CHANNEL OR THE TAILINGS OF A TOPSOIL SCREENING OPERATION WITH GRADATION ADJUSTED TO CONFORM TO THE FOLLOWING TABLE:

STONE / SIEVE SIZE	% FINES, BY MASS
600 MM	100
300 MM	20-50
4.75 MM	0-30
75 UM	0-5

THE BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND THE AGENCY OF NATURAL RESOURCES STREAM ALTERATION ENGINEER, AND WILL BE PAID FOR UNDER THE ITEM 651.40, GRUBBING MATERIAL, MODIFIED.

12. IN-STREAM CONSTRUCTION SHALL OCCUR ONLY BETWEEN JUNE 1 AND OCTOBER 1, UNLESS THE CONTRACTOR OBTAINS WRITTEN PERMISSION FROM THE AGENCY OF NATURAL RESOURCES TO DO THE WORK OUTSIDE OF THAT TIME FRAME.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE AGENCY OF NATURAL RESOURCES STREAM ALTERATION ENGINEER, A TEMPORARY STREAM DIVERSION PLAN TO CARRY LAOD BROOK DURING CONSTRUCTION OF THE NEW CULVERT. THE STREAM DIVERSION SHALL BE DESIGNED FOR A FLOW OF 2.8 CMS. THE PLAN SHALL DEPICT MEASURES PROPOSED TO PREVENT EROSION AND SEDIMENTATION AND TO MAINTAIN STREAM WATER QUALITY. ANY PIPE USED FOR THE DIVERSION SHALL HAVE A NOMINAL DIAMETER NO LESS THAN 1500 MM.



PROJECT NAME:	POWNAI
PROJECT NUMBER:	STP RS 0107(8)
FILE NAME: /STR5/84028/SC02850X.DGN PLOT DATE:	12-APR-2001
PROJECT LEADER: CRAIG S. KELIER	DRAWN BY: SHANGRAW
DESIGNED BY: SHANGRAW	CHECKED BY:
ROW SHEET 4 OF 9 SHEETS	